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said amplifying circuit contains an oscillating transistor and first and second quick start-up circuits;

said first quick start-up circuit applies, for a predetermined length of time after application of power supply voltage Vcc, power source voltage Vcc to said piezo resonator as an oscillation quickening voltage via said bypass transistor switch provided in said first quick start-up circuit; and

said second quick start-up circuit, for a predetermined length of time after application of said power supply voltage Vcc, increases collector current by bypassing a collector resistor or a emitter resistor or collector and emitter resistors with said bypass transistor switch provided in said second quick start-up circuit.--

#### REMARKS

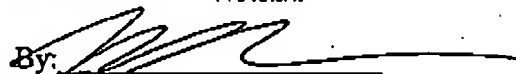
Applicant has added new claims 46-51. Applicant respectfully submits that these newly added claims 46-51 are supported by the application as originally filed and do not contain any new matter. In addition, Applicant respectfully submits that these newly added claims read on the species Q of Figs. 28 and 29.

Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The attached page is captioned "Version with markings to show changes made."

In view of the above, therefore, it is respectfully requested that this Preliminary Amendment be entered, favorably considered and the case passed to issue.

Please charge any additional costs incurred by or in order to implement this Preliminary Amendment or required by any requests for extensions of time to KODA & ANDROLIA DEPOSIT ACCOUNT NO. 11-1445.

Respectfully submitted,  
KODA & ANDROLIA

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#### Certificate of Transmission

I hereby certify that this correspondence is being facsimile transmitted to the Patent and Trademark Office Fax No. (703) 872-9318 on May 30, 2003.

William L. Androlia

Name

Signature

5/30/2003

Date

Application No. 10/088,420

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

Add new claims 46-51 as follows:

--46. A piezo oscillator comprising a quick start-up circuit and an oscillation circuit that contains a piezo resonator and an amplifying circuit, wherein

said quick start-up circuit is comprised of:

a bypass transistor switch that bypasses predetermined circuit portions of said oscillation circuit,

a control transistor switch that makes ON/OFF controls of said bypass transistor switch, and

a capacitor connected to a base of said control transistor switch; and

said quick start-up circuit functions so that for a predetermined length of time between application of power supply voltage  $V_{cc}$  and completion of charging of electrical charge to said capacitor, a charge current according to said charging of said electrical charge is supplied to said control transistor switch, thus activating ON operation of said control transistor switch and bypass transistor switch; and

changes in operation conditions of said oscillation circuit by said ON operation temporally increase electric current that flows in said piezo resonator to forcibly vibrate said piezo resonator, thus making start-up of said piezo oscillator faster.

47. The piezo oscillator according to claim 45, wherein

said quick start-up circuit is structured so that

a single NPN transistor that is used for both said bypass transistor switch and said control transistor switch is connected, in forward polarity, between said power supply voltage  $V_{cc}$  line and one terminal of said piezo resonator, and

said capacitor is provided between said power supply voltage  $V_{cc}$  line and a base of said NPN transistor; and wherein

a start-up quickening voltage is applied, for said predetermined length of time, to

said piezo resonator from said power supply voltage Vcc line via said NPN transistor, thus temporarily increasing electric current that flows in said piezo resonator to forcibly vibrate said piezo resonator, and making start-up of said piezo faster.

48. The piezo oscillator according to claim 45, wherein

said quick start-up circuit is comprised of a first NPN transistor, which is said bypass transistor, and a second NPN transistor which, is said control transistor, and is structured so that:

said first NPN transistor is connected, in forward polarity, between said power supply voltage Vcc line and one terminal of said piezo resonator,

a resistor is inserted and connected between a base and an emitter of said first NPN transistor,

said NPN transistor is connected, in forward polarity, between said power supply voltage Vcc line and a base of said first NPN transistor, and

said capacitor is inserted and connected between said power supply voltage Vcc line and a base of said second NPN transistor; and wherein

a start-up quickening voltage is applied, for a predetermined length of time after application of said power supply voltage Vcc, to said piezo resonator from said power supply voltage Vcc line via said NPN transistor, thus temporarily increasing electric current that flows in said piezo resonator so as to forcibly vibrate said piezo resonator, and making start-up of said piezo oscillator faster.

49. The piezo oscillator according to claim 45, wherein according to rise of voltage of said power supply voltage Vcc and for a predetermined length of time after application of said power supply voltage Vcc, said quick start-up circuit outputs start-up quickening voltage that has steeper rise characteristics than the rise characteristics of said power supply voltage Vcc,.

50. The piezo oscillator according to claim 45, wherein

said amplifying circuit contains an oscillating transistor and a collector resistor for said oscillating transistor,

said collector resistor is inserted and connected between collector and emitter of

said bypass transistor switch in said quick start-up circuit,

a base of said control transistor switch and said power supply voltage Vcc line are connected via said capacitor, and

a collector of said control transistor switch and a base of said bypass transistor switch are connected; and wherein

with a control of an ON/OFF operation of said control transistor switch according to a charge current of said capacitor, terminals of collector resistor of said oscillating transistor are connected by said bypass transistor switch for a predetermined length of time after application of power supply voltage Vcc so as to increase collector current, thus temporarily increasing electric current that flows in said piezo resonator so as to forcibly vibrate said piezo resonator and to shorten start-up time of said piezo oscillator; and after said predetermined length of time, a control by said quick start-up circuit is stopped and collector current of said oscillating transistor switch is lowered to a desired level.

51. The piezo oscillator according to claim 45, wherein

said amplifying circuit contains an oscillating transistor and first and second quick start-up circuits;

said first quick start-up circuit applies, for a predetermined length of time after application of power supply voltage Vcc, power source voltage Vcc to said piezo resonator as an oscillation quickening voltage via said bypass transistor switch provided in said first quick start-up circuit; and

said second quick start-up circuit, for a predetermined length of time after application of said power supply voltage Vcc, increases collector current by bypassing a collector resistor or a emitter resistor or collector and emitter resistors with said bypass transistor switch provided in said second quick start-up circuit.--